USE OF OVER-THE-COUNTER MEDICATIONS IN PREVENTION AND TREATMENT OF UPPER RESPIRATORY TRACT INFECTIONS

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Over-the-counter (OTC) medications are a fast developing branch of the pharmaceutical industry, in both Poland and rest of the world. The aim of the work was to evaluate the factors that influence the purchase and use of OTC medications in prevention and treatment of upper respiratory tract infections. The analysis involved 450 randomly chosen subjects, aged 19-80. The study was performed using a questionnaire which included a number of questions related to the characteristics of respondents such as: health, socio-demographic data, and factors influencing the purchase of OTC medications used in respiratory tract infections. The self-medication phenomenon in upper respiratory tract infections is significant in Poland and will continue to increase with support of many demographic and socio-economic factors. Despite certain health risks resulting from the inappropriate use of OTC medications, it should continue to be offered as a part of the pharmaceutical market.

Key words: infectious diseases, over-the-counter drugs, respiratory tract

INTRODUCTION

Infectious diseases of the upper respiratory tract such as: acute pharyngitis, acute tonsillitis, sinusitis, and laryngitis are the most common seasonal cause of morbidity in each phase of ontogenesis. The mode of treatment depends on the etiology of the infection. In the majority of cases (80%) these infections are caused by rhinoviruses, coronaviruses, adenoviruses, Influenza virus A and B, and respiratory syncytial and Epstein-Barr viruses. Streptococcus pyogenes,
Staphylococcus aureus, Mycoplasma pneumoniae, Candida albicans, and other pathogens play an important role as well, especially in chronic and recurrent infections (1-4).

A number of medications used in the treatment of such infections belong to the group of OTC medications. OTC medications constitute an extremely dynamic sector of the pharmaceutical market. They increasingly gain in popularity and patients' trust every year. According to IMS Health, a 10% increase in OTC sales has been noted last year. Their availability, however, does not mean that they are free from side-effects. A number of disputes and controversies concerning the OTC have been going on among pharmacists, medical doctors, and politicians take place (5-10).

Thus, the aim of the present study was to investigate the self-medications phenomenon in western Poland, to compare the results with literature, identify the factors influencing the OTC market for upper respiratory tract infection medications, and to characterize the OTC buyers.

PATIENTS AND METHODS

The study was approved by an institutional Ethics Committee. The study encompassed 450 randomly chosen men and women aged 19-80 from western Poland. The study was performed using a questionnaire created by the authors of this article, which included a number of questions related to characteristics of the respondents such as: health (self-assessment of health condition, frequency of occurrence, and type of respiratory tract infections), socio-demographic data (age, gender, education, place of residence, main source of income, and economic status), and factors influencing the purchase of OTC medications used in respiratory tract infections.

Quantitative variables, such as age, were categorized. The collected data were set in cross-tabulation and multiple response tables. The initial statistical and meritorious evaluation of the data was performed using independent Chi² test for cross tabulation tables and available statistics (V & C Cramera, Φ - Yule’a), calculating the magnitude of relation between categorical variables. P<0.05 was accepted as the level of statistical significance. The relationship between variables was analyzed based on correspondence analysis - a descriptive/exploratory technique designed to analyze simple two-way and multi-way tables. The logistic regression model was used for the interpretation of the discussed aspects. All analyses were performed using Statistica 8.0 commercial package.

In the discussion, data published by the following companies were used: Central Statistical Office (GUS), National Institute of Hygiene (PZH), TNS OBOP, Main Pharmaceutical Inspectorate (GIF), Polish Association of the Self Medications Industry (PASMI) as well as IMS Health, PMR, AC Nielsen, and Gemius, a Polish internet market research company.

RESULTS

The respondents scored their health condition very highly; the majority ~50% of them, regarded it as excellent or very good, with only 4% reporting it not satisfactory. Despite such optimistic self-health evaluations, the study showed a
high incidence of respiratory tract infections (80%). Nose and throat infections (79%), influenza (61%), angina (32%), and sinusitis (19%) were the most commonly reported infections. The frequency of occurrence made OTC the most commonly purchased medications. The data confirmed how often OTC were used, 94% of respondents confirmed using them for respiratory tract infections. The most frequently used OTC medications, singly or in combination, were: analgesics and NSAIDs, decongestants, expectorants, antitussives, antihistamines, topical anesthetics and others, including homeopathic medications. In general, the OTC medications influencing general immunity of the organism, medications decreasing permeability of capillary vessels, and vitamin C were purchased relatively rarely. Only 10% of respondents bought them as a prophylaxis during the respiratory tract infection season, others purchased them when the first symptoms appeared.

The pharmacy still remains the main place to purchase OTC products (80% of respondents). For the majority of respondents, the pharmacy guarantees a high level of service and product choice. Only 6% of patients purchased the OTC medications at petrol stations, supermarkets, small local shops, kiosks, or on the internet.

The majority of respondents diagnosed themselves and purchased OTC medications without any consultation with their general practitioners (GP). Only 21% of them arranged a GP visit after the first symptoms of an infection appeared. In 30% of cases, patients consulted a pharmacist regarding the OTC purchase. In 30% of cases, the OTC purchase was based on the drug availability, in 22% on affordability, in 20% of cases due to lack of time for a GP visit, and 20% respondents used their own previous experience. It should be underlined that commonly used advertisements influenced the purchase of OTC medications in only 7% of cases.

Interesting results were obtained by analyzing correlations between all the categorical variables. Chi\(^2\) test and the multiple correspondence analyses (MCA) confirmed the co-existence of interactions between the variables analyzed (Fig. 1A, B, and C). A number of significant correlations were observed between the OTC purchase and socio-demographic features such as: age, gender, marital status, place of residence, education, and the source of income. The highest interest in OTC medications was noted among the respondents who were professionals working on contract. No significant correlation was found between the poor economic situation and the avoidance of OTC purchase. However, people who were worse off more often chose home methods of treatment (68%). A significant correlation was noted between the OTC purchase and education and age of the respondents. For the majority of the respondents (~80%) with the 2\(^{nd}\) or 3\(^{rd}\) education level, the cost of OTC medications was not significant. However, it was important for ~50% of the respondents with primary education. The respondents with primary education purchased OTC from a pharmacy in only 11% of the cases, despite the fact that the pharmacists' opinion did matter (35%). For 44% of the respondents with primary
education, the GP’s opinion was the most important. However, only 33% of them visited the GP at the time of the respiratory tract infection.

Fig. 1. Multiple correspondence analyses (MCA) showing the co-existence of interactions between the variables analyzed; see explanation in the Results section.
Patients with the 3\textsuperscript{rd} level education living in larger towns (>100000) constituted the group which most often consulted a GP (46%), even though it was their own experience and not that of the GP which influenced their decision to purchase OTC (74%). Single people (excluding divorcees) more often attended GP visits, which correlated significantly with age. In the age group under 60 years, 80% of the respondents did not consult their GP at the onset of symptoms. In the group over the age of 60 years, this situation changed as more than 70% of the patients consulted their GP.

Young and middle-aged people in a good financial situation showed the highest interest in OTC medications, caused by lack of time to arrange a GP visit and did not consider the OTC price, a factor which is significant in the older population (50% of population over the age of 60 years). It was observed that in the population aged over 60, the number of individuals going to the pharmacy and purchasing OTC after the first symptoms of infection appeared dropped significantly. The younger population more often uses the pharmacy for both OTC purchases as well as pharmacist consultation.

For a better picture of the self-administered medication phenomenon, the logistic regression model was used. As the binary dependent variable, "1" was regarded as a decision to purchase OTC based on a GP consultation. The "0" value was assigned to all other variables which influenced OTC use at the time of the respiratory tract infection without a GP consultation. Variables which describe the examined phenomenon in the best way were chosen based on previous analysis of data with Chi\textsuperscript{2} test and correspondence analysis (Fig. 1). The dichotomic variable regarding the purchase of OTC medications in the pharmacy at the time of the first symptoms of respiratory tract infections was similarly analyzed.

While building the logistic models, after the estimation using Rosenbrock and quasi-Newton methods was performed, particular variables which were not statistically significant were removed, in order to find the best fit for the empirical data using the incremental chi-squared test. The following statistically significant variables (P<0.05) were taken into account: gender, age, place of residence and the level of education. Using the unitary odds ratio and taking into account the categories of the analyzed variables, it appears that a higher probability of attending a GP visit at the instance of first symptoms of respiratory tract infection can be found in females, older population, residents of larger towns, and subjects with the 3\textsuperscript{rd} education level (Fig. 1). The probability of seeing a GP is 1.8 times higher in women rather than men, more than 2 times higher among residents of large towns with the 3\textsuperscript{rd} education level and 3.2 times higher in older people above the age of 60 when compared with younger populations between the ages of 20–40 years. In the case of pharmacy choice at the moment of first symptoms, the most statistically significant were: gender, place of residence, lack of time and experience. The probability of the pharmacy choice was higher among females.
DISCUSSION

Self-medication is a phenomenon which continues to grow in Poland and also in other countries in the world. Regarding the dynamics of the purchase of OTC medication, the year 2007 presented record sales of almost 2 billion Euros. The above data places Poland 5th in Europe. The average Polish citizen spent 42 Euros on OTC medications in the year 2007, compared with a German citizen who spent approximately 140 Euros (10). When compared with the year 2006, a 15% increase in OTC sales was noted, including the highest sales in OTC medications used in respiratory tract infections. According to IMS Health Poland, its value has increased by 30% in the last 12 months and a recent prognosis is that the dynamics of OTC sales could increase by a further 14%. The increase of sales in the OTC sector is combined with the launch of new methods of distribution. About 140 products are available in out-of pharmacy sale. In the present study it was found that the main place for OTC purchase is the pharmacy. The growing tendency towards OTC sales will continue. According to AC Nielsen, monitoring out of pharmacy sales of OTC products, the out of pharmacy sales increased by 8% in 2007, mainly in the case of medicated lozenges for throat and cough conditions (44%). The highest out of pharmacy OTC purchase was noted among young people, predominantly male. The lowest sales were noted among older population, above the age of 60 years (11, 12).

Since Poland joined the EU, a new mode of OTC distribution has become available - internet sales - which is allowed under the EU law. In the present study only 2% of respondents purchased OTC on the internet. However, according to Gemius (13), an increase in popularity and trust towards OTC medications among internet users has been observed. In 2005, only 29% of the population purchased OTC medications without prescription, whereas this increased to 80% in 2006. Anti-influenza medications constituted the second, after analgesics, group of most commonly purchased OTC medications (noted in over 50% of internet users). Currently, there are about 70 internet addresses for OTC sales on Polish internet pages (13). The presence of such addresses has been the subject of many controversies. Internet OTC pharmaceutical trade has been encouraged by the European Court of Justice ruling in 2003 which stated that their prohibition is not in accordance with the current EU rules. However, Polish Parliament resolved the pharmaceutical rule allowing mail order sales of OTC medications on March 30, 2007. It has become obvious that internet OTC sales will increase with the continuing increase in availability of computers and internet access as a time and cost saving measure. On the other hand, some internet users have noted disadvantages of OTC internet purchase, such as long
shipping times, lack of personal contact with the pharmacist, and lack of knowledge about the type and source of medications.

The increase in the self-medications phenomenon is due not only to wider OTC availability, but also to lack of time, inappropriate health system arrangements, and difficulty in arranging an appointment with a GP. The improving financial situation of the Polish population plays an important role as well. Increased wealth status can drive higher OTC purchase, which can be used by pharmaceutical companies to develop more relevant marketing strategies. The OTC advertisement in the field of increasing sales should become the subject of interest of the health promotion addressed to the general population.

Education of patients as well as medical professionals in this area is required. The examination performed by the authors and other population studies show a strong position of the traditional pharmacy. The self-medication phenomenon increases the role of the pharmacist when choosing OTC medications. Modern pharmacists should be aware of the seriousness of symptoms and whether the patient is allowed to use OTC or should be referred to a GP. The most common mistake made when purchasing OTC is extensive polypragmasy, which leads to an increase of side effects and drug interactions. It can also lead to drug overuse and drug addiction.

It has been underlined in a number of studies, including ours, that the Polish population overuses pain killers. Pain killers constitute the most frequently purchased OTC group of medications, including their use in respiratory tract infections. Anti-inflammatory or antihistamine medications are frequently recommended as a first-line treatment. Polish patients are not familiar with the consequences and limitations of OTC self-medication. The Polish population does not display a habit of reading the drug information leaflet and in their opinion the OTC availability is proof of OTC safety. Lack of knowledge of OTC medications can result in their inappropriate use and polypragmasy of the same type of medications, occurring under different names, increasing the risk of overdose.

Unfortunately the lack of an educational OTC strategy, including the provision of information on the health consequences of OTC overuse, is noted. Taking into consideration the popularity and common use of OTC medications, the above mentioned should become one of the aims of the pharmaceutical politics of the country in both medical and economical respects. The dynamics of OTC sales will continue to show a tendency to increase which will also correlate with demographic conditions in Poland. According to the Polish Central Statistical Office (GUS), the lowest percentage of young people, under the age of 20 years, and the highest percentage of older population, above the age of 65 years, has now been noted during the last 50 years (14). In 2020, the older population will constitute 26% of the general population in Poland.

The increase of the OTC market is also related to the frequency of occurrence of infections. According to PMR Research data, a decrease in some OTC sales
dynamics in 2006 correlated with a decrease in influenza morbidity when compared with previous years. It has been reported in the literature that electronic monitoring and retrospective analysis of OTC sales could constitute an independent source of information for early warning systems for both epidemic and pandemic planning (15, 16).

In conclusion, the self-medication phenomenon in upper respiratory tract infections is considerable and will continue to increase with support of many demographic and socio-economic factors. Despite certain health risks resulting from inappropriate use of OTC medications, OTC should continue to be offered in the pharmaceutical market. Self-medications may have a positive influence on prophylaxis and health care, reducing the involvement of medical care professionals and partially transferring the financial responsibility for prophylaxis and treatment of some upper respiratory tract infections directly onto the patients. The conditions of health and economic success, which underlie the basis of self-medications politics and create the "need" for OTC medications, are promoting systemic and legal solutions in regard to medical and pharmaceutical regulations in the pharmaceutical politics of the country.

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